

Pre-implementation Planning and Financial Tie-ups

3.1 Planning

NTPC in its Corporate Plan (2002-17) fixed a target of capacity addition of 11,210 MW to be achieved during 2007-12. This corporate plan was approved by Board of Directors (BOD) in July 2003. Subsequently, the Company decided to increase its installed capacity to 50,000 MW by 2012 by fixing (2007-08) a target of 22,430 MW.

Audit also observed that as many as eight projects⁹ involving 6,130 MW included in the above capacity addition programme were identified even before the beginning of the previous capacity addition programme (2002-07) and work on these projects (except North Karanpura and Nabinagar) was actually in progress during 2002-07. However, non-completion of these projects between 2002 to 2007 resulted in shifting of these projects to 2007-12. Thus capacity target of 22,430 MW was set for 2007-12 while a comparatively smaller target of 9,160 MW was set for 2002-07.

3.2 Identification and Planning of New Projects

NTPC has to follow various procedures for finalizing and setting up a Power Plant viz., selection of site & technology, tying up of inputs and getting various statutory clearances. From conceptualization to setting up of thermal plants and Hydro plants, NTPC requires various kinds of approvals and clearances (**Annexure-III**) from different agencies and its Board. The new projects are identified by NTPC, selection committee of Central Electricity Authority (CEA), State Electricity Boards/Power utilities and others.

3.3 Delay in Pre-order activities

3.3.1 The project management system developed by the Company called 'Integrated Project Management & Control System' (IPMCS) introduced in 1978 and last revised in 2006 requires the management to develop a pre-order network and master network to ensure that all pre-order activities are completed in time. Timely completion of pre-order activities ensures ordering of main plant immediately after Investment approval.

It was, however, observed that the Company did not formulate pre-order network laying down activity-wise scheduled dates for each pre-order activity. Hence, activity-wise delays could not be identified in Audit. An exercise in audit, however, revealed that the Company took 10 to 102 months (**Annexure-IV**) in 21 projects (average time 48 months) from identification/conceptualization of a project to investment approval for the project.

⁹ Barh-I, Sipat-I, Kahalgaon-II, North Karanpura, Dadri-II, Sipat-II, Bhilai & Nabinagar (Out of these projects, Nabinagar and Bhilai projects were targeted by the Company in 2002-07 in addition to the targets fixed by the Planning Commission. Further, the capacity of Kahalgaon-II and Sipat-II was revised by the Company from 660 MW each to 1500 MW and 1000 MW respectively)

In 12 projects, the management took 10 to 48 months in completing the pre-order activities. Against this, the management took 48 to 60 months in three¹⁰ projects, 60 to 80 months in another four¹¹ projects and 80 to 102 months in two¹² other projects in completing the pre-order activities.

One of the major areas of uncertainties faced by the Power Sector is environmental clearances from Ministry of Environment and Forest (MOEF). It was, however, observed that in as many as four projects¹³ the management took 24 to 42 months in arriving at the zero date¹⁴ even after getting environment clearance which delayed the commissioning of the projects.

The Management stated (November 2010) that pre-investment works involve a number of activities requiring various Government approvals and lot of uncertainties like getting land and water commitments. Therefore, the analysis should be done on the basis of time taken after approval of the Feasibility Report. Moreover, there was a benchmark time period for activities like finalization of specifications, Notice inviting tender and Letter of Award.

We do not agree with the Management because timely completion of pre-feasibility activities is an integral part of the project management for expeditious completion of the project. Based on its long standing experience, the Company should have developed a time schedule for each pre-order activity (not only limited to finalization of specifications, notice inviting tenders and letter of award) for better project management.

Details provided in **Annexure-IV** reveal that Sipat-I conceptualized in 1995 is still under construction even after 15 years. Barh-I is another project under construction even after 12 years of its conceptualization. In the case of Kahalgaon-II, 11 years were taken in completing the project from its conceptualization. Few more projects like Mauda, Nabinagar, Vellur and Korba-III which were conceptualized in February 2001, January 2002, June 2002 and February 2003 respectively, are also still under construction. Project-wise analysis revealed that six projects could not be commissioned timely due to following reasons:

- Though the Feasibility Report of Sipat-I (4x500 MW) was submitted (April 1997) to CEA for Techno-Economic Clearance (TEC), the management decided to change the project size to 3x660 MW at the suggestion (November 1999) of Ministry of Power without preparing a fresh FR. In fact, CEA accorded (January 2000) TEC to the changed project size on the basis of FR submitted on 30.04.1997 for project size of 4x500 MW. After TEC, the management took almost four years in finalizing the main plant contract. The construction activities of the project are still under Progress.

¹⁰ Kahalgaon-II, Rihand-III and Vindhyachal-IV.

¹¹ Nabinagar JV, Vellur, Barh-I and Dadri-II

¹² Mauda and Sipat-I

¹³ Sipat-I, Barh-I, Kahalgaon-II and Nabinagar JV

¹⁴ Zero date is the date of award of main plant contract.

- CEA accorded TEC for Kahalgaon-II (2x660 MW) in November 2001. The management, however, with the justification of achieving faster completion of the project decided (February 2003) to change the unit size to 500 MW and project size to 1500 MW and implement it in two stages i.e. stage I (2x500 MW) and stage II (1x500 MW). Due to change in project size and unit size, the Environment Clearance for stage-II (1x500 MW) was delayed and was received on 20.05.2004. Though the unit size and project size was changed with a view to achieving faster completion, the project was completed only in March 2010 taking 80 months from the date of award of main plant for Stage-I, i.e., 18.07.2003.
- The FR of Barh-I was approved in May 2000 and CEA accorded TEC in September 2001. The management however, could finalise the main plant contract only in March 2005, taking abnormal time of 42 months.
- Though Vindhyachal-IV(2x500 MW) and Rihand-III (2x500 MW) were identified in April 2004 as projects for future capacity addition programme, the management started the project related activities as late as in January 2007, i.e. after 30 months of conceptualization, when it decided to develop these two projects as substitutes for two Gas based projects (Kawas-II and Janhor-Gandhar-III).
- The Nabinagar-JV project was delayed due to delay in finalization of JV agreement with Railways. Though the project was conceived in January 2002, the JV agreement with Railways was signed only on 06.11.2007 and the subsidiary Company was incorporated on 22.11.2007 under the name “Bhartiya Rail Bijlee Company Limited” in joint venture with Ministry of Railways. NTPC and Ministry of Railways' share was 74 per cent and 26 per cent respectively.

The Management stated (November 2010) that the process of forming joint venture involved series of meetings to thrash out various issues with the Ministry of Railways and for obtaining CCEA approval which took time.

The fact remains that more than five years were taken to finalise the Joint Venture arrangement with the Ministry of Railways, which ultimately delayed the project.

- One project (North Karanpura) is delayed by 125 months due to dispute with Ministry of Coal over project site and indecisiveness of management to shift the project site. The management has incurred expenditure of ₹ 149.33 crore (up to March 2010) on this project.

3.3.2 The Company has set benchmark¹⁵ of 33 to 36 months for synchronization of a 500 MW project, however, **no such benchmark is available for pre-investment**

¹⁵ The Company submitted to the Committee on Public Undertaking (Refer Page No.15 of 34th Report of 2008-09) that the time taken by NTPC units from start of construction to synchronization was 33 to 36 months.

approval activities. Thus without a benchmark Audit could not judge whether the time taken by the management for such activities was realistic. **The professional management of the Company should have been more pro-active in handling the pre-order activities** in many of the projects as was done in respect of Jhajjar project where pre-order activities were completed in 10 months. Therefore, the fact remains that the Company could have handled other projects as efficiently and judiciously as Jhajjar project.

3.4 Other issues related to Planning

- 3.4.1** Audit observed that **Board of Directors is apprised about the unit size and technology of a project only at feasibility report approval stage which is too late a stage to adopt any progressive changes proposed by the BOD.**

The Management stated (August/November 2010) that the Board of Directors was generally aware of the new expansion projects prior to Feasibility Report proposal.

The fact remains that the Board level management was not specifically informed about the selection of unit size/ project size and technology till submission of FR/ revised FR to them.

- 3.4.2** Out of 18 thermal projects, sub-critical technology was adopted in 15 projects and super critical technology was adopted only in three projects with a view to accelerate quicker capacity addition, though the super critical technology is more cost effective¹⁶, thermal efficient¹⁷ and environment friendly. In the case of Bongaigaon, in addition to sub-critical technology smaller unit size of 250 MW (three units) was adopted without any justification. As Operation & Maintenance expenses allowed under CERC tariff regulations (2009-14), were higher for 250 MW size unit (₹ 18.20 lakh per MW per annum) as compared to 500 MW size unit (₹ 13.00 lakh per MW per annum), the beneficiaries would be required to buy power at higher rate.

Regarding selection of sub-critical technology Management stated (August/November 2010) that in case of 660 MW, the space requirement is higher and accommodating 500 MW units are found more appropriate in some stations in view of space constraints as per the Layout of existing stations and also to accelerate capacity addition program. For Bongaigaon project, Management stated that the decision to implement 250 MW units was taken considering all techno commercial aspects including power demand of North Eastern region, grid stability, and limitation of ash dyke area.

Audit does not agree with the Management's viewpoint as **selection of sub-critical technology was not based on any cost-benefit analysis or layout of existing stations and the objective of management for quicker capacity addition was also defeated as most of the projects with sub-critical technology were progressing slowly.** The reply on Bongaigaon project is also not tenable as

¹⁶ As per Report of Committee of CEA published in November 2003

¹⁷ Super-critical technology adopts better steam parameters (i.e. higher steam pressure and higher main steam/ reheat temperature) as compared to sub-critical technology with a view to derive increased efficiency gains.

- There is an overall power shortage in the country and additional power would always have a market somewhere in the country.
- The grid stability is ensured by the transmission company by matching the grid capacity according to power generation.
- The ash dyke could also be accommodated in the same area as is being done by the Company in its Vallur project with 2X500 MW capacity in the allotted land of 1002 acre as against 1014 acre available at Bongaigaon.

3.4.3 The Company planned to set up (March 2006 and July 2006) one 500 MW project each at Korba and Farakka. Since Farakka Power Station was already facing problems in meeting coal requirement for its existing units, and sufficient space was available at Korba for setting up two units, the possibility of postponing the capacity addition at Farakka and setting up two units at Korba was not explored. This would have reduced the project cost by ₹ 501.89¹⁸ crore by availing deemed export benefits¹⁹ available to a Mega Power projects under existing Foreign Trade Policy.

The Management stated (November 2010) that putting up two units of 500 MW at Korba was not favoured as it required identification/acquisition of additional land for ash-dyke, large scale infrastructural development works including provision of various cross overs/bridges across the MGR rail tracks leading to higher project cost.

We do not agree with the Management as the decision of the Company for not putting up 2X500 MW plant at Korba was not supported by proper cost benefit analysis of all relevant factors including higher project cost and deemed export benefits.

3.4.4 Due to delayed decision (September 2007) of adding one more unit of 500 MW at Vallur where construction of 2x500 MW project was already going on, the Company had to place separate orders for main plants – two units in August 2007 and one unit in July 2009. Resultantly, the Company is liable to incur an additional cost of ₹ 390.47 crore on account of price increase due to time flux and foregoing bulk purchase benefits. Further, as various clearance and permissions had to be obtained again in respect of 3rd unit, award of various Balance of Plant packages was delayed by 4 to 14 months which would ultimately affect the commissioning of even first two units.

Management stated (August/November 2010) that third unit was planned at a later date with a view to optimize the layout with certain modifications.

The reply is not acceptable. If three units could be constructed within the available infrastructure, the planning for third unit should have been done simultaneously to avoid unwarranted delays and increase in the cost of the project. Further the objective of optimization of layout was not achieved as construction cost (per MW) after addition of one more unit increased from ₹ 6.07 crore to ₹ 6.26 crore.

¹⁸ Worked out @ 10 per cent as adopted by Management for justifying estimated cost of projects before the BOD

¹⁹ As per Foreign Trade Policy, Deemed Export Benefits were available to thermal power projects with capacity of 1000 MW and above.

3.5 Investment Approval and project financing

3.5.1 Investment Approvals

3.5.1.1 On completion of all pre-order activities (Refer *Annexure III*), the proposal to invest in the project is approved by Board of Directors. Independent financial appraisal of the projects is one of such pre-order activities which ought to be conducted by NTPC from financial institutions. Audit, however, observed that the financial appraisals made by the financial institutions were based on technical parameters/financial data provided by NTPC and, therefore, to that extent the data was not got independently validated.

3.5.1.2 Audit observed that **per MW construction cost** of the thermal projects approved by NTPC between February 2007 and May 2009 **ranged between ₹ 5.00 crore and ₹ 5.91 crore as against ₹ 4.00 crore envisaged (February 2007) by the Working Group on Power for Eleventh Plan (2007-12) which even after considering price rise during intervening period worked out to maximum of ₹ 4.45 crore.** An analysis of cost details of project approved after February 2007 is placed at *Annexure-V*.

A comparison of cost of projects of NTPC and the Private/State Sectors revealed that costs of NTPC were higher as discussed below:

- Whereas Adani Power Maharashtra Private Limited's estimated (main plant contract awarded on 28.02.2008) cost was ₹ 4.68 crore per MW for a 1980 MW project (3x660 MW), the per MW cost of Barh-II (2x660 MW) to which investment approval was accorded in February 2008 worked out to ₹ 5.56 crore per MW; the total extra cost for the project works out to ₹ 1,161.60 crore.
- The estimated per MW cost of Khaperkheda TPS (1x500 MW) being developed by Maharashtra State Power Generating Company Limited was ₹ 4.34 crore on 12.05.2006 whereas the approved per MW cost of Korba-III (1x500 MW) and Farakka-III (1x500 MW) projects of NTPC were ₹ 4.90 crore and ₹ 5.14 crore as on 24.03.2006 and 31.07.2006 respectively. The comparative higher cost estimated by NTPC on these two projects works out to ₹ 280 crore and ₹ 400 crore respectively.

While remaining silent on the above two issues; Management stated (November 2010) that the project cost depends on various factors and therefore, varies considerably depending on the scope of work involved in each project.

We do not agree with the Management because cost (per MW) of similar projects taken up by the private/State sector companies around the same time was not much different from the cost (per MW) envisaged by the Working group. The fact, therefore, remains that despite indications about huge differences between NTPC approved project costs and the cost envisaged by the Working Group, NTPC did not go in for independent appraisal of the project cost which could have facilitated better appreciation of the realistic cost parameters.

3.5.2 Project Financing

CERC regulations for the period 2004-09 and 2009-14 provided that for determination of tariff the debt equity ratio of any power generation project as on the date of commercial operation would be 70:30. While adhering to this pattern, NTPC met the equity portion for execution of the projects out of internal accruals and debt component was arranged through foreign/domestic borrowings and issuing bonds. **The management took timely action for tying up the required finance for execution of projects and the progress of projects at any point of time did not suffer because of shortage of funds.** Despite this Audit observed that the progress of many of the projects was affected due to other reasons as discussed in Chapter IV.

3.6 Conclusion

The Company had not fixed yearwise targets for achieving the target of capacity addition of 22,430 MW. The target of capacity addition programme suffered due to lack of scientific approach to planning; consequently projects are running behind schedule. The Company had also taken 10 to 102 months from conceptualization to investment approval which indicates that management's approach to pre-order activities was not systematic.

Delays in pre-order activities, change in planning and subsequent change in scope of work relating to the projects resulted in extra capital cost of ₹ 2851 crore on construction of various projects.